Technical/Final Report
to
Saskatchewan Agriculture Development Fund

Options In Applying Insecticide to Cattle On Summer Pasture

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Options In Applying Insecticide To Cattle On Summer Pasture (ERDA Project 2.3-2)

Prepared by Calvin Mulligan
Livestock Branch, Sask. Agriculture
April 1987

There is a lack of insecticide application technology which meets the criteria of: minimal labour requirement and convenience; effectiveness against a spectrum of biting flies including black flies; and reasonable price. This project carried out during the summer of 1986, attempted to evaluate self-treatment insecticide stations and two types of insecticide sprayers in the hope they could provide cattlemen with some new "tools".

Part A: Self Treatment Insecticide Stations

74 producers in the black fly zone of north-eastern Saskatchewan signed co-operator agreements; 63 installed either a free choice or a forced use station charged with either malathion or a dichlorvos - crotoxyphos mixture and; 46 completed evaluations.

Under 1986 conditions of "mild to moderate" black fly harassment, a majority of producers rated their stations either "moderately effective" or "very effective" as a method of insecticide application. A higher percentage of forced use (v.s. free choice) station owners rated their units "very effective". A majority said they would recommend the concept to a neighbour. The major criticisms concerned poor cap design and insecticide leakage in Pest Doom ® oilers, inadequacy of insecticide coverage on calves and extent of body coverage in general. The average cost of station construction was approximately $150.00 (a single backrubber station). The insecticide cost around $3.10 per adult animal for the season.

The self treatment station can be extended within the limits of backrubber-applied insecticide registrations. Once backrubber-applied insecticides are registered for black fly control, the concept can be extended for this application. Station testing under conditions of "severe" black fly harassment is desirable. The importance of self-treatment stations as another option in fly control is enhanced by the fact that the problem of fly resistance to insecticide ear tags is expected to appear in Canada.

Part B: Insecticide Sprayers/Foggers

One electrostatic sprayer was evaluated by the manager of the Lands Branch Community Pasture who used it on 3 herds totalling 1,126 head. The other was assigned to two producers near Weldon as is for use on herds of 60 and 200 animals. Co-operators applied an Ectiban 5 E.C. R - water mixture at a rate of 1/4 gm active ingredient per animal.

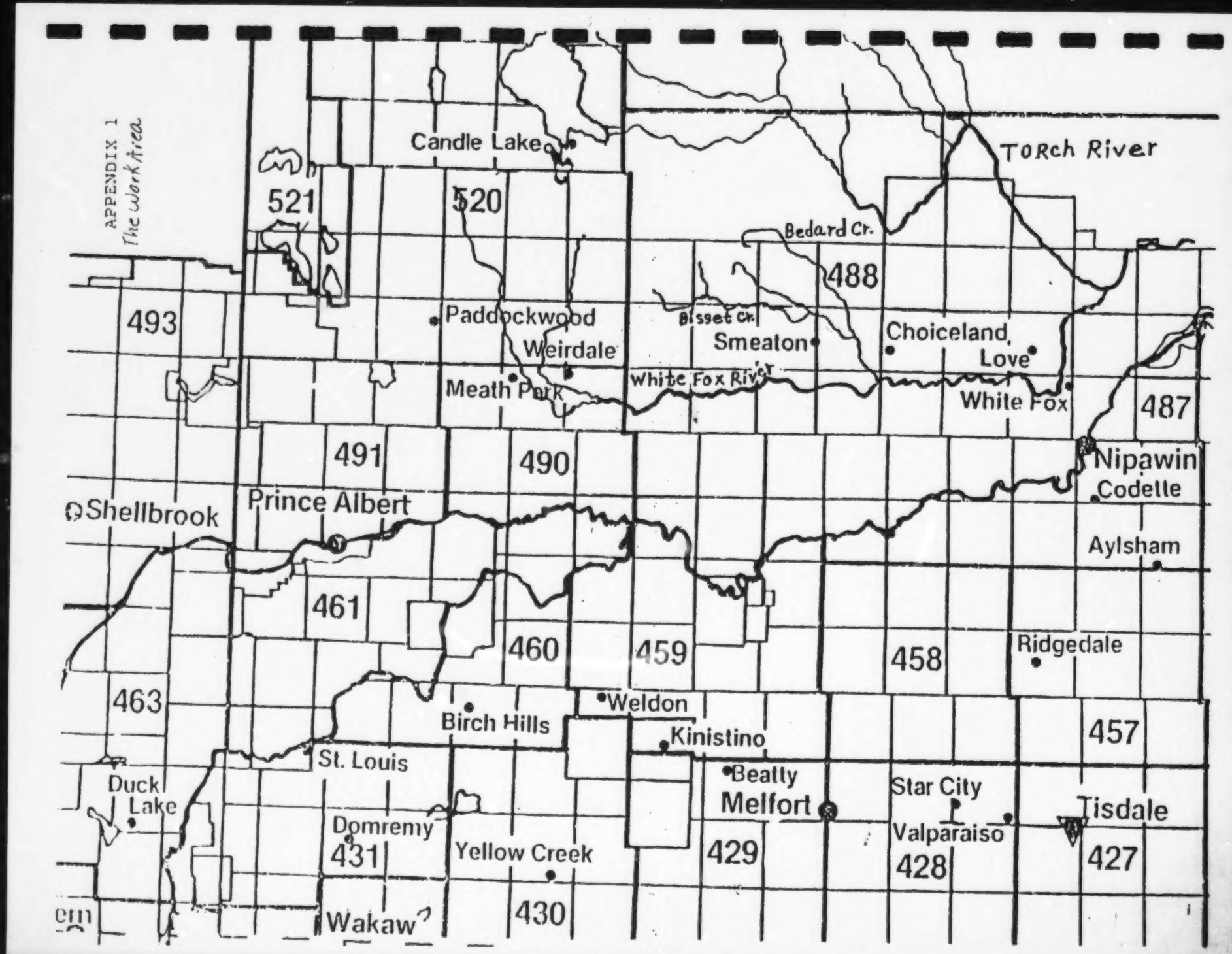
The key features of the electrostatic sprayer are (1) its insecticide-conserving nature and (2) the reach of its spray jet (30-60 feet). Together, these features made it possible to treat unconfined cattle on the range. Some refinements: (1) in the mounting bracket to permit easy height adjustment and (2) to permit adjustment of the nozzle from the truck cab would make this unit more "user friendly". Electrostatic sprayers have not been developed to a commercial stage. Depending upon the outcome of Lands Branch tests with self-treatment insecticide stations, the prototype electrostatic sprayer could serve those pastures in the black fly zone as "emergency" applicators when the results of river larviciding are considered inadequate or local black fly populations are problematic.

The Mapes Eliminator ® mist fogger was evaluated by a herd owner at Meath Park and by 2 other cattle producers in the area on herds of approximately 50 animals each. Co-operators applied a mixture of Ectiban 5 E.C. ® and mineral oil. The Mist fogger lacks the insecticide - conserving feature of electrostatic application and has a shorter reach (15-20 feet). For these reasons it is best suited to situations where: biting flies - black flies, in particular are an occasional problem and where small herds or feedlots are involved. Shared ownership may be an option.

Acknowledgement:

This project was funded under the Federal-Provincial ERDA program.

The contribution of all project co-operators and the following individuals are appreciated: Carol Elian, Lloyd Saul, Jim Armstrong, Barry Swanson, Stuart Adam, Ed Tanner, Larry Lee, Bill Henley, Martin Wrubleski, Paul Gebhardt, and Brian Hart.


APPENDIX 1
The work Area
Candle Lake
TORch River
521
520
Bedard Cr.
488
493
Paddockwood
Bisset Cr.
Smeaton
Choiceland
Weirdale
Love
Meath Park
White Fox River
White Fox
487
491
490
Nipawin
Codette
Shellbrook
Prince Albert
Aylsham
461
460
459
458
Ridgedale
463
Weldon
Birch Hills
Kinistino
457
St. Louis
Beatty
Star City
Duck Lake
Melfort
Tisdale
Domremy
Valparaiso
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Yellow Creek
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Wakaw
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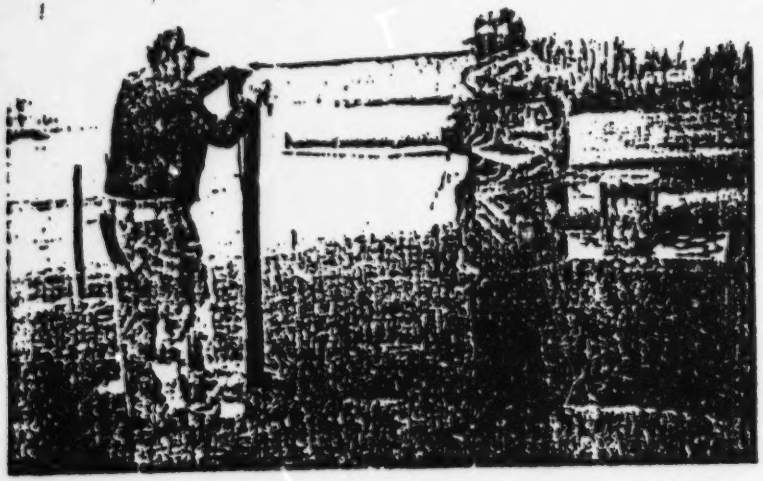

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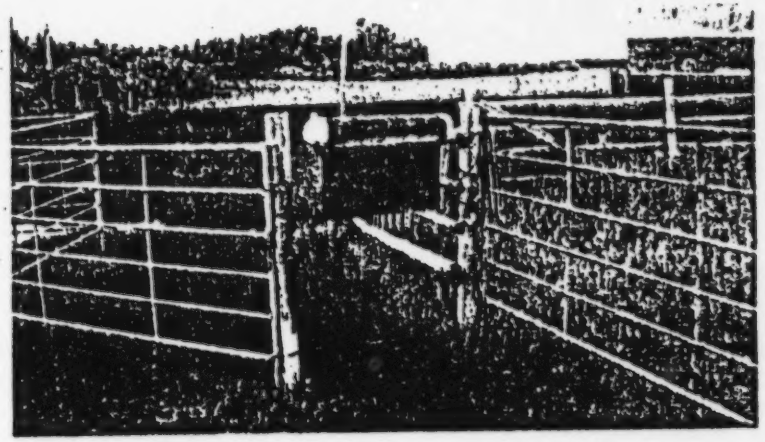
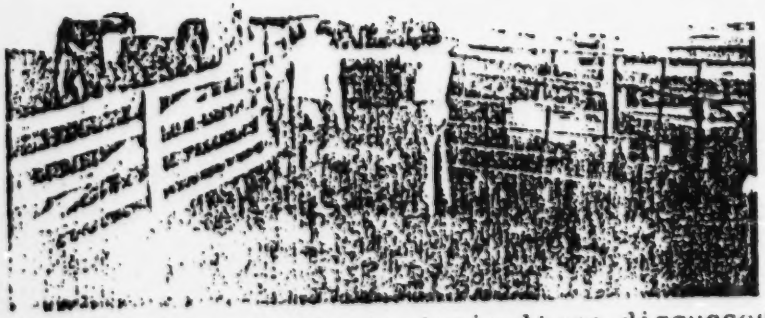
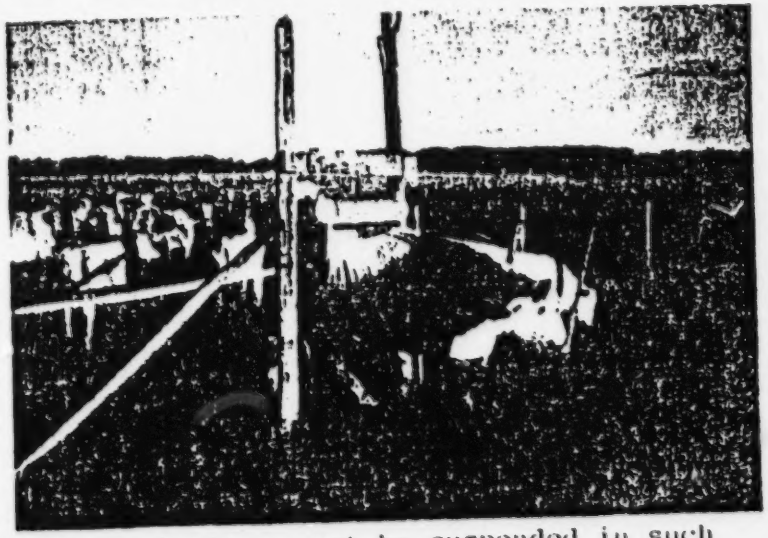


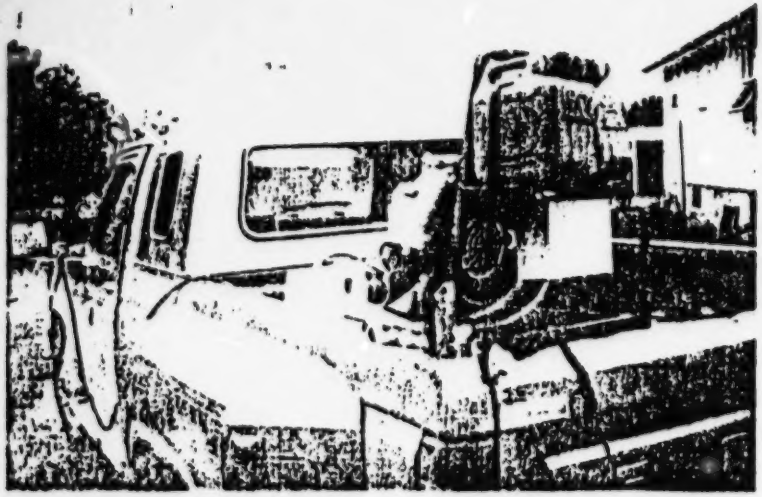
A total of 63 forced use and free choice stations were installed as part of the 1986 evaluation project. In general, co-operators favoured forced use stations.



Dr. Ali Khan of Alberta Agriculture discusses station performance with owner, Dave Melnyk of Domremy. In this case the cattle receive an insecticide treatment.on their way to water.



The backrubber must be suspended in such a way that contact with the animal causes sufficient rotation of the unit to release insecticide into the wick.



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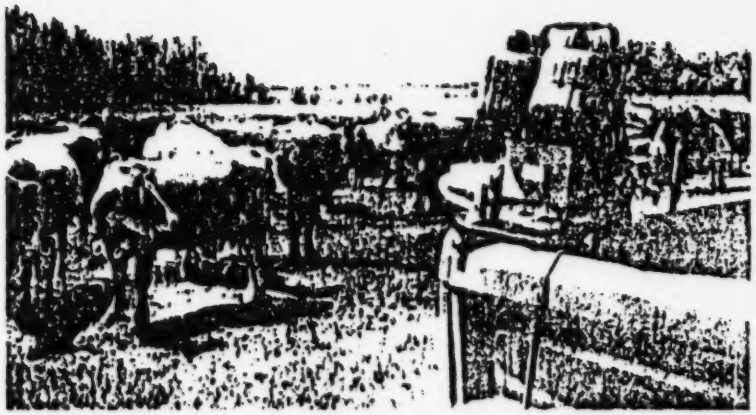

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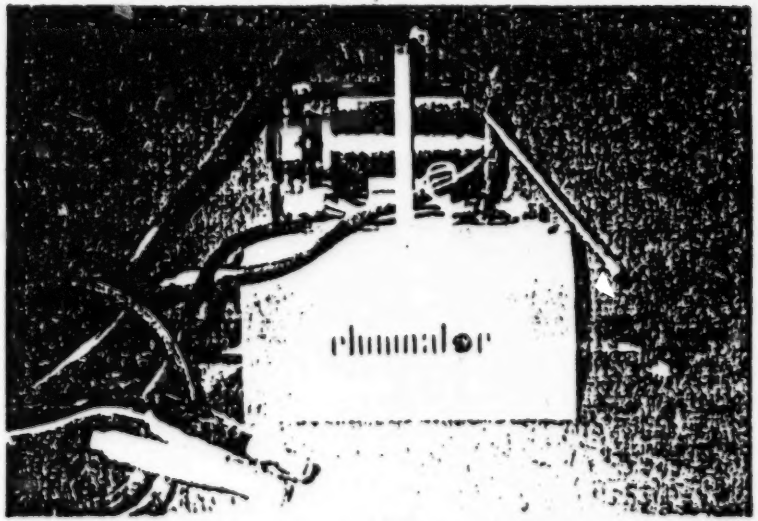

Its light weight and simplicity are positive features of the Eliminator ® mist fogger.

Options In Applying Insecticide To Cattle on Summer Pasture (ERDA Project 2.3-2)

Prepared by Calvin Mulligan
Saskatchewan Agriculture, April 1987

Abstract:

Fifty-two cattle producers in north eastern Saskatchewan evaluated self-treatment insecticide stations and two types of insecticide sprayers.

Self-treatment insecticide stations are a practical method of fly control and a possible alternative to insecticide ear tags. Forced-use stations appear superior to free-choice. Producer criticisms concerned adequacy of insecticide application to calves, adequacy of body coverage and Pest Doom Oiler ® leaks. Station performance in "severe" black fly infestations is unknown.

The Eliminator ® mist fogger * appears suited for small herds, feedlots or where animals can be readily confined. The prototype electrostatic sprayer is suitable for range use, however, patent restrictions limit its application .

Background and Objectives

Biting fly attacks are generally believed to have an adverse effect on cattle productivity and to be a constraint to the expansion of cattle production in northern Saskatchewan. Black flies (Simulidae) are the dominant pest species in north eastern Saskatchewan in an area extending 40-50 miles on either side of a line between Prince Albert and Nipawin, where cattle producers have traditionally used smudges, sheds, insecticide ear tags, manually-applied insecticides and stand-alone backrubbers as methods of protection against biting fly pests. An apparent need exists for convenient methods capable of providing protection against a spectrum of biting fly pests.

Alberta Agriculture demonstrated in 1983 and 1984 that significant reductions in blood feeding biting fly populations (including mosquitoes and black flies) could be achieved using self-treatment insecticide stations to apply permethrin and dichlorvos-crotoxyphos mixtures. Between 1983 and 1985, the Lethbridge Agriculture Canada Research Station developed a prototype electrostatic sprayer which they had shown could be used to apply insecticide (permethrin) to cattle on range during black fly attacks. The objective of the project was to assess the utility of both the self-treatment insecticide station and the electrostatic sprayer for protecting cattle against biting flies and in particular, black flies in Saskatchewan

*Purchased from Thornhill Ranching Products, Mossleigh, Alberta.

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Part A

Self-Treatment Insecticide Stations

Methods/Approach

Co-operating cattle producers in the "black fly zone" (Appendix 1) were solicited through mass media, public meetings and personal contact by program staff based in Prince Albert, Ag. Reps located in the black fly zone and the regional livestock specialist in Tisdale.

A co-operator agreement required the Department to provide:

1. Consultation and a complementary Pest Doom ® Applicator;
2. A minimum of two farm visits during the season to make observations and collect fly samples; and
3. A report on the project's results.

Co-operators in turn were obliged to:

1. Install either a forced-use or free choice station;
2. Keep the applicator charged with either malathion or a crotoxyphos-dichlorvos mixture; and
3. Observe the performance of the station and file an evaluation report.

A third year agriculture student was hired, trained in biting fly identification and given the job of implementing the project.

Results and Discussion

1. Co-operator participation in the project was as follows:
   - 74 producers signed agreements
   - 53 producers installed a self-treatment station
   - 46 co-operating cattle producers completed evaluations.
2. Producer evaluation:
   - 54% of station owners rated station performance "moderately effective"
   - 43% rated their stations performance as "very effective"

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- 39% said they'd recommend the concept to a neighbour.

- 27% (4 of 15) free-choice station owners vs 52% (16 of 31) forced-use station owners rated their station "very effective."

Major Criticisms:
- poor inlet design and cap on Pest Doom ® applicator (20 replacement caps distributed);

- 28% insecticide leakage occurs from applicators where canvas cover is too narrow to cover all the release holes;

- 11% inadequate insecticide dosage is applied to calves; and

- 15% inadequate body coverage.

Note

- Fly counts and sweep net collections were made on 37 visits to 27 paired co-operator herds. On all occasions, except two, black fly harassment was "mild" and the number of black flies collected was near zero to minimal.
- Average self-treatment station cost was approximately $150.00 dollars (single backrubber). Insecticide costs for the season were around $3.10 per head.

The prevailing black fly conditions during the summer of 1986 were "mild to moderate". This made assessment of station performance in severe black fly infestations impossible. Such an assessment would be desirable.

In general, co-operators found the self-treatment station to be a practical, convenient and reasonably priced method of insecticide application (insecticide price is a variable). Generally, owners of forced-use stations tended to rate station performance higher than owners of free-choice stations. This is consistent with Alberta Agriculture information indicating free choice stations use about one-third less insecticide than forced use stations. Since salt is used as an attractant in free choice stations, exposure of the herd to insecticide will vary depending upon their salt requirement. It appears appropriate therefore to recommend forced use stations over free choice wherever practical.

There is room for design and quality control improvements in the Pest Doom ® oiler which would increase convenience and reduce insecticide waste. This requires improvement in the design of the inlet, design of a new cap and effort to ensure the canvas cover is consistently cut to an adequate length to cover the release holes on the barrel of the applicator.

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Conclusions/Impact

Extension of the self-treatment station should proceed within the limits of available insecticide registrations. At this point, no backrubber-applied insecticides are registered for black fly control. Continuing effort should be directed toward this problem in that recommendations outside those uses stated on the label are in violation of the Pest Control Products Act. Backrubber-applied insecticides are registered for the control of the horn fly, face fly, house fly and stable fly. Where these pests are a problem, self-treatment stations may be considered. Since the problem of fly resistance to insecticide eartags is now common in the U.S. and is expected to occur in Canada, the self-treatment station option leaves producers less vulnerable and provides an additional tool for fly control.

This project illustrates the value of involving co-operating producers in evaluations of this kind. Given the appropriate orientation or training and evaluation instruments, producers contribute constructive criticism, practical suggestions and useful observations which can suggest the best route in the extension of new technology once it has been assessed.

Acknowledgment

This project was funded under the federal-provincial Economic Regional Development Agreement (ERDA).

The contribution of Project Technician, Carol Elian; Livestock Specialist, Jim Armstrong (Tisdale) and Agricultural Representatives: Barry Swanson (Prince Albert); Stuart Adam (Melfort); Ed Tanner (Tisdale); and Larry Lee (Nipawin); and co-operating producers is appreciated.

Part B

Electrostatic Sprayers and Mist Foggers

Methods/Approach

Two Eliminator ® mist foggers were purchased and two electrostatic sprayers assembled based on a modification of the prototype design developed by the Agriculture Canada Research Station, Lethbridge.

One mist fogger was assigned to a co-operating cattle producer at Meath Park (herd size 30); the other to two other producers in the area with herd sizes of approximately 50 each. Herd owners were supplied with Ectiban 5 EC ® and instructed to apply insecticide mixed with mineral oil at ten day intervals. An electrostatic sprayer was assigned to the manager of the Lands Branch Community Pasture at Garrick for a one month period of use on three herds totalling 1,126 head. A second was assigned to two producers near Weldon for a three month period of use on herds of 60 and 200. Herd owners were supplied with Ectiban 5 E.C. ® and instructed to apply an insecticide-water mixture at a suggested rate of 1/4 gm ai/animal (5 cc insecticide/animal) at ten day intervals. Co-operators were contacted periodically throughout the period and interviewed at the end of the season on their assessment.

Results and Discussion (Based on co-operator reports)

Mist Foggers

- generally convenient to use
- no mechanical problems reported
- optimum nozzle distance from nozzle to target 15-20 feet
- two to three uses required to get herd accustomed to sound
- preparation, use and clean-up on average required fifteen minutes for a herd of 40 depending upon how closely animals were bunched
- producers unable to measure duration of protection
- one user said sharing the unit was okay, the other felt it was problematic
- assuming a dose of 5 cc E.C. insecticide/head; an insecticide cost of 30¢./animal; 15 minutes labour for 40 head at a cost of $6.00/hour and a total of 10 treatments/season; the total cost/animal/season is $6.75.

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Electrostatic Sprayers

- two users reported no mechanical problems; one reported nozzle bolts vibrated loose and he had to correct a short in the control box

- mounting system requires a capability for height adjustment to achieve optimum "reach" and insecticide distribution

- after about three uses, animals became accustomed to the noise the unit makes

- preparation, use and clean-up averaged 15 to 30 minutes for a herd of 60 and one hour for a herd of 200 depending upon animal distribution on pasture

- producers unable to measure duration of protection

- two users felt arranging shared use when required was a problem; one suggested renting it from the R.M. office at a nominal rate

- assuming a dose of 5 cc E.C. insecticide/head; an insecticide cost of 30¢/animal; 30 minutes labour at $6.00/hour and a total of ten treatments/season, the total cost is $8.00/animal for the season

The best features of the Eliminator ® mist fogger include its light weight, small size, battery hook up - portability and simple operation. Its "V" spray fogging cloud implies an inherent level of waste that increases with the distance from the nozzle to the target.

The strengths of the electrostatic sprayer are the insecticide-conserving aspect of electrostatic application and the "reach" of its stream. This makes it possible to carry out range applications on fairly large sized herds at reasonable cost without the hassle of trying to confine them. Some refinements in the mounting system to permit easy height adjustment and adjustment of nozzle angle by the operator from the truck cab would make the unit more "user-friendly."

The electrostatic sprayer, the mist fogger and any system requiring human operation, has the disadvantage of requiring the herd owner to make an assessment of when an application is needed, set aside whatever else is calling for attention and operate it. Cattlemen will have a tendency I suspect, to only apply insecticide when the signs are obvious, e.g. cattle are bunching. Haufe's research at the Agriculture Canada Station at Lethbridge, however, suggests prophylactic application may be required in order to optimize animal performance.

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Conclusions/Impact

Commercial electrostatic sprayers are not yet available and patent restrictions are in effect. The system is, nonetheless, effective. Given this situation and the uncertainty that afflicts the black fly larviciding programs in north eastern Saskatchewan, electrostatic sprayers could be considered back-up emergency control devices for the protection of cattle in Lands Branch pastures in the black fly zone. This should give pasture managers and pasture patrons an additional measure of security in those instances when the results of larviciding are inadequate or local populations of black flies are problematic.

The Mapes Eliminator (R) mist fogger is a suitable applicator in situations where biting flies (black flies in particular) are an occasional problem in feedlots or where small herds that can be easily confined in drinking or lounging areas are involved. Its portability and simplicity makes shared use between herd owners an option. For those still relying on manually operated sprayers and smudges, this could be a definite step up.

Acknowledgment

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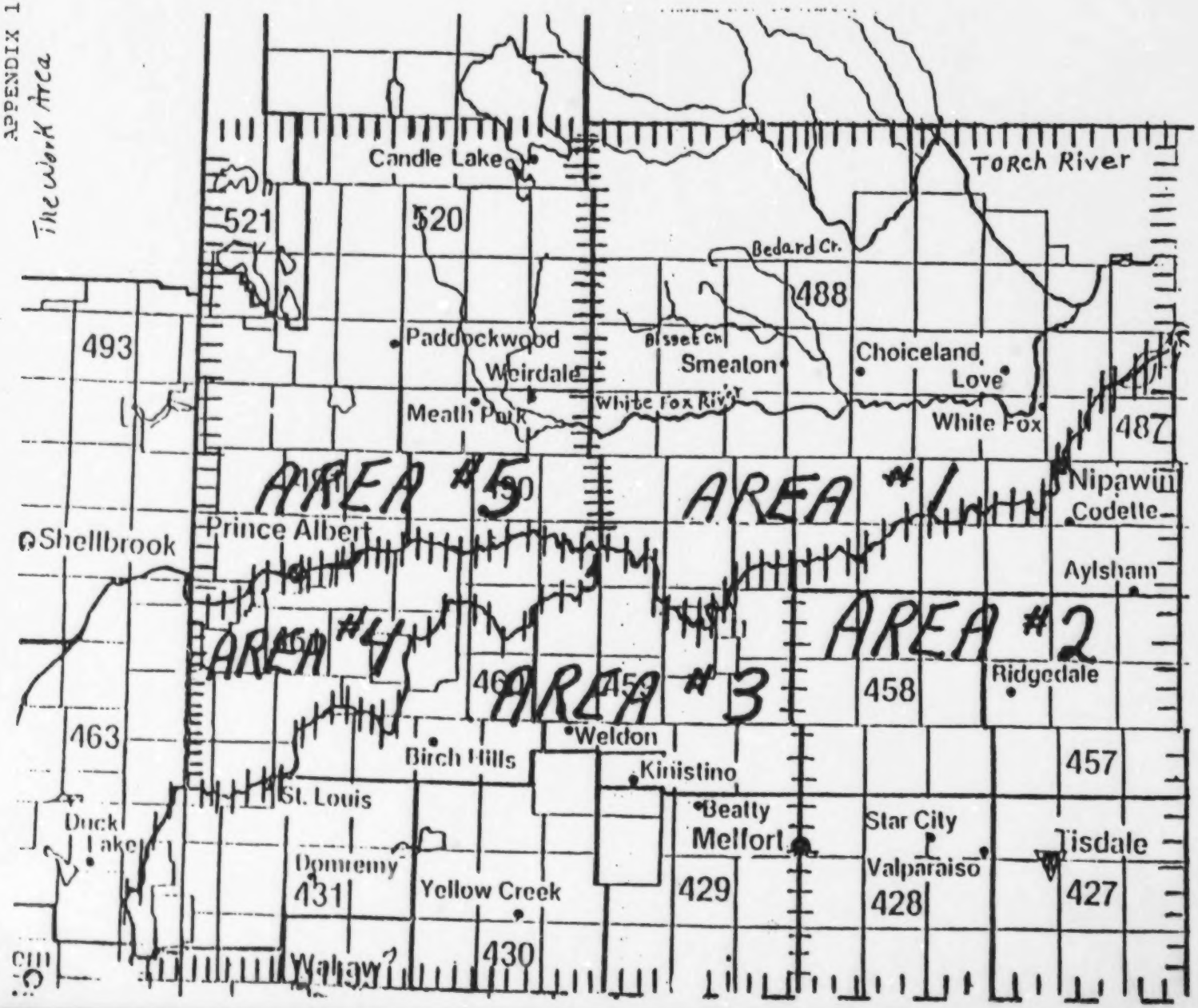
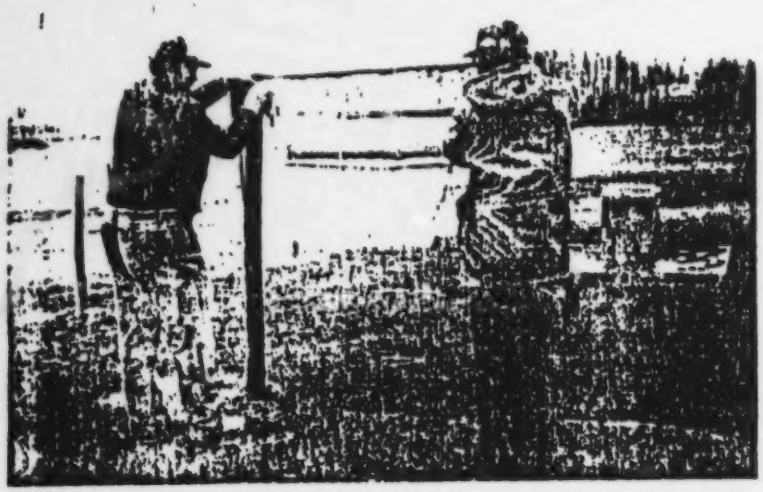
We would also like to thank Project Technician, Lloyd Saul and Jim Armstrong, Bill Henley, Martin Wrubleski, Paul Gebhardt, Brian Hart and all co-operating producers.

APPENDIX 1

The work Area





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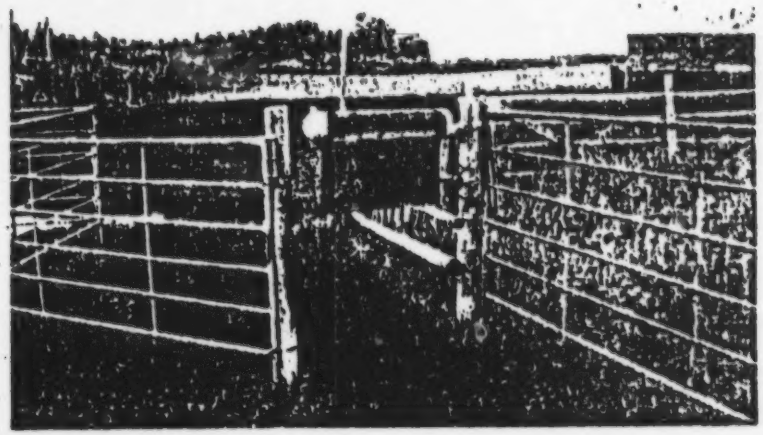

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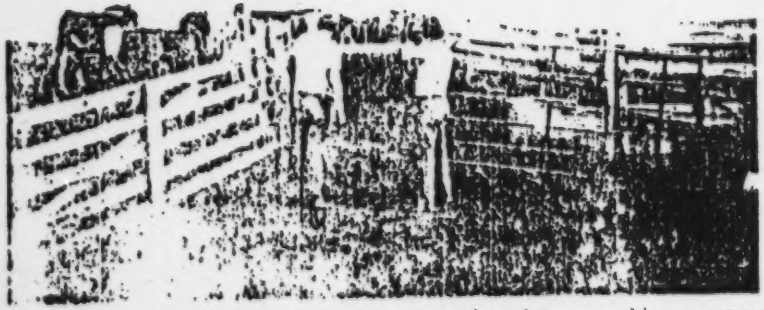

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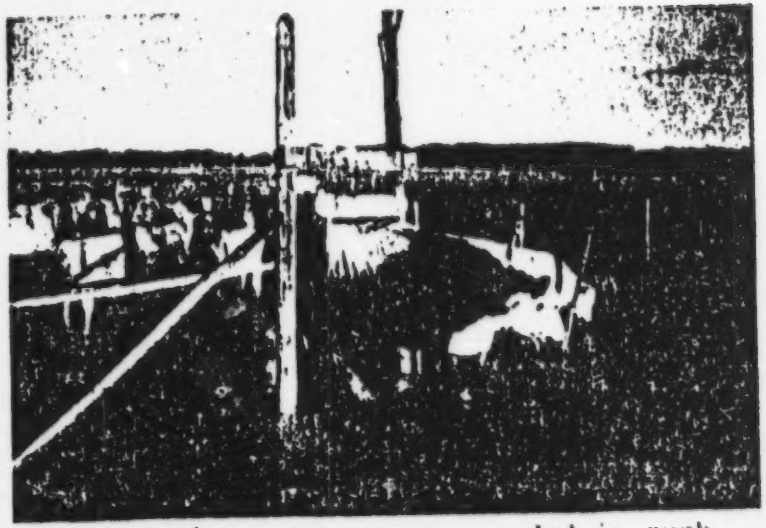

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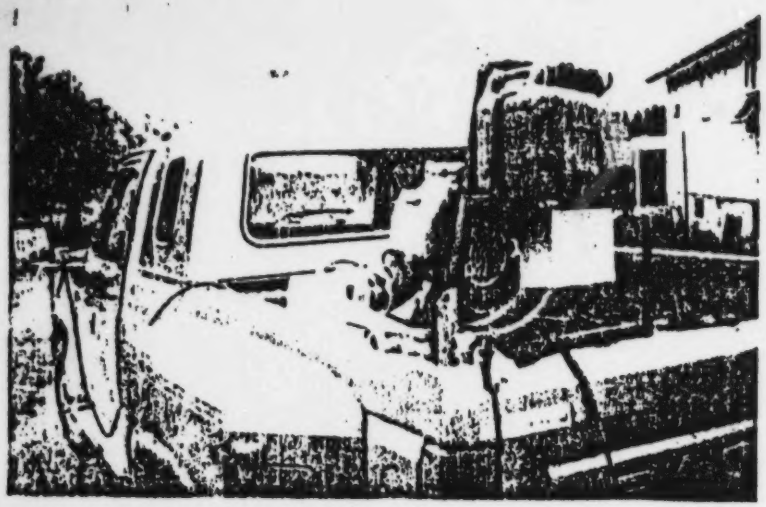

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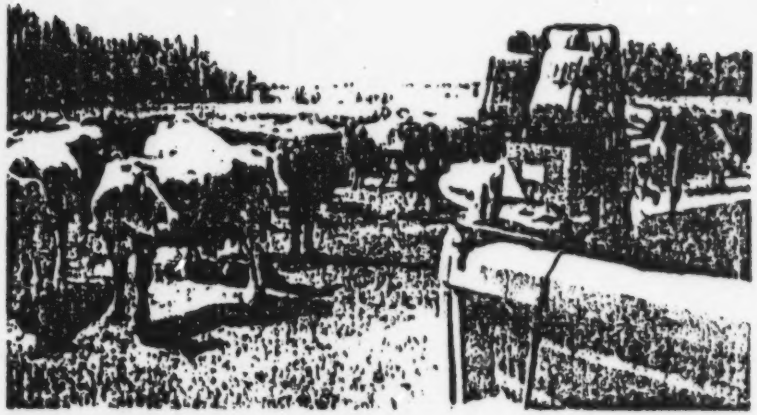

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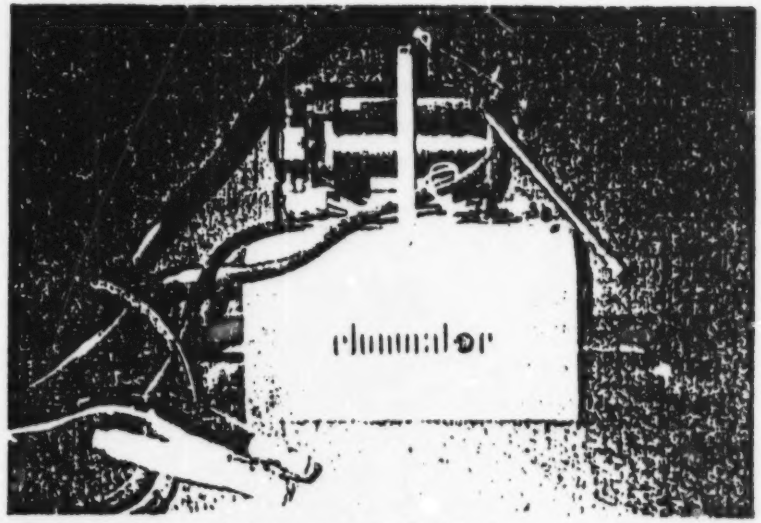

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